

Applicant: JOHNSON *et al.*
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This listing of claims will replace all prior versions and listings of claims in the Application.

LISTING OF CLAIMS:

1. (Currently Amended) A gas analysis device for remotely determining concentrations of at least two exhaust gas constituents in at least one characteristic of a vehicle emission plume, comprising:

a radiation source which directs radiation through an emission plume of a moving vehicle;

a plurality of moveable at least two filters, arranged on a rotatable filter wheel, that are sequentially positionable to receive the radiation from said the radiation source after the radiation has passed through a the vehicle emission plume of the vehicle, wherein each of said the at least two filters being is capable of filtering out radiation except for a predetermined wavelength band; and

a detector positioned such that radiation from said the radiation source may be sequentially directed onto said the detector via the at least two filters to thereby produce a plurality of at least two detector responses proportional to the intensity of radiation directed onto the detector via said the at least two filters.

2. (cancelled)

3. (Currently Amended) The device according to claim 2 1, wherein the filter wheel and the detector are housed in a housing which is sealed to substantially prevent radiation from reaching the detector except via one of said the at least two filters.

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4. (Currently Amended) The device according to claim 1, further comprising a general filter ~~which that~~ removes substantially all visible light from a radiation beam passed ~~through~~ said general filter ~~there-through~~, said wherein the general filter being ~~is~~ positioned such that a beam from ~~said~~ the radiation source ~~must pass~~ passes through ~~said~~ the general filter after passing through ~~a vehicle~~ the emission plume of the vehicle and ~~but~~ before reaching ~~said~~ the detector.
5. (Currently Amended) The device according to claim 1, wherein ~~said plurality one~~ of the at least two filters ~~comprise at least one~~ comprises a reflective filter.
6. (Currently Amended) The device according to claim 1, wherein ~~said plurality one~~ of the at least two filters ~~comprise at least one~~ comprises a pass through filter.
7. (Currently Amended) The device according to claim 1, wherein ~~said~~ the radiation source projects a beam of infrared radiation across the path of ~~a~~ the moving vehicle.
8. (Currently Amended) The device according to claim 1, further comprising a processor for processing ~~the~~ at least one two detector ~~response~~ responses to provide information about the composition of ~~an exhaust~~ the emission plume of ~~a~~ the moving vehicle.
9. (Currently Amended) The device according to claim 8, further comprising an indicator for informing the processor which ~~filter~~ of the at least two filters is optically aligned with the detector for a particular detector response.

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10. (Currently Amended) A method for remotely determining concentrations of at least two exhaust gas constituents in at least one characteristic of a vehicle emission plume, comprising the steps of:

- a) providing a source of radiation and a plurality of filters each of which is capable of filtering out radiation except for radiation in a predetermined wavelength band;
- b) directing radiation from the a radiation source through an emission plume of a moving vehicle to a first filter and then to a detector, wherein the first filter is arranged on a rotatable filter wheel and is capable of filtering out radiation except for a first predetermined wavelength band;
- c) generating a first detector response indicative of the intensity of radiation received by the detector via the first filter;
- d) positioning a further filter rotating the filter wheel such that the radiation from the radiation source is directed through the exhaust emission plume of the moving vehicle to the further a second filter arranged on the filter wheel and then to the detector, wherein the second filter is capable of filtering out radiation except for a second predetermined wavelength band;
- e) generating a further second detector response indicative of the intensity of light radiation received by the detector via the second filter positioned in step d); and
processing the first and second detector responses to provide information about the composition of the emission plume of the vehicle
- f) optionally repeating a sequence of steps d) e) to obtain an additional detector response for each repetition of the sequence; and
- g) determining at least one characteristic of the vehicle emission plume from said detector responses.

11. (cancelled)

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12. (Currently Amended) The method according to claim 10, further comprising: ~~the step of passing the radiation from the emission plume through a general filter, to remove substantially all light having a wavelength outside a predetermined broad detection band, after the radiation has passed through the emission plume of the vehicle, but before the radiation reaches the filter wheel prior to directing said radiation to the plurality of filters.~~

13. (Currently Amended) The method according to claim 10, wherein ~~the plurality of filters filter wheel~~ and the detector are located within a housing which is sealed to substantially prevent radiation from reaching the detector except via one of said the at least two filters.

14. (cancelled)

15. (Currently Amended) The method according to claim 14, wherein ~~the radiation source of radiation directs projects~~ a beam of infrared radiation across the path of ~~a~~ the moving vehicle.

16. (Currently Amended) The method according to claim 10, wherein one of the at least two filters comprise at least one comprises a pass through filter.

17. (Currently Amended) The method according to claim 10, wherein one of the at least two filters comprise at least one comprises a reflective filter.

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18. (Currently Amended) A method for remotely determining concentrations of at least two exhaust gas constituents in ~~least one characteristic~~ of a vehicle emission plume, comprising the steps of:

- a) providing a source of radiation and a plurality of filters each of which is capable of filtering out radiation except for radiation in a predetermined wavelength band;
- b) directing radiation from the ~~a~~ radiation source through an emission plume of a moving vehicle to a first filter and then to a detector, wherein the first filter is capable of filtering out radiation except for a first predetermined wavelength band;
- c) generating a first ~~detector~~ response indicative of the intensity of radiation received by the detector;
- d) altering the position of positioning the detector such that the radiation from the ~~radiation~~ source may be directed through the ~~exhaust~~ emission plume to a ~~further~~ second filter and then to the detector, wherein the second filter is capable of filtering out radiation except for a second predetermined wavelength band;
- e) directing the radiation from the source to the filter positioned in step d) and then to the ~~detector~~;
- f) generating a second ~~detector~~ response indicative of the intensity of ~~light~~ radiation received by the detector via the ~~further~~ second filter; and
- processing the first and second responses to provide information about the composition of the emission plume of the vehicle
- g) optionally repeating a sequence of steps d) f) to obtain an additional ~~detector~~ response for each repetition of the sequence; and
- h) determining at least one characteristic of the vehicle emission plume from said ~~detector~~ responses.

19-20. (cancelled)